

Universal Design for Learning-Based Inclusive Classroom Management at SD Labschool UNESA 2 Surabaya

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Abstract

Inclusive education in Indonesia faces a persistent gap between normative policy commitments and actual classroom practice, particularly in how teachers manage heterogeneous classrooms at the primary school level. This study aims to describe inclusive classroom management based on Universal Design for Learning (UDL) at SD Labschool UNESA 2 Surabaya, focusing on: (1) physical and social environment management, (2) instructional differentiation and student grouping, and (3) facilitating and inhibiting factors of implementation. A descriptive qualitative approach was employed, with data collected through structured observation, semi-structured interviews with a class teacher and a special education companion teacher (GPK), and documentation on 6 May 2026. Data were analyzed using the interactive model of Miles, Huberman, and Saldaña (2014), with triangulation and member checking to ensure credibility. Findings reveal that all three UDL principles multiple means of representation, engagement, and action and expression are implemented in an integrated manner through instructional differentiation, flexible assessment, peer tutoring, positive behavior management, and inclusive school culture. The school's affiliation with Universitas Negeri Surabaya (UNESA) serves as a key institutional facilitator distinguishing it from regular inclusive schools. This research contributes empirical documentation of how UDL principles are operationalized in inclusive classroom management in the Indonesian primary school context.

Keywords: *inclusive classroom management, Universal Design for Learning, primary school, special needs students, qualitative descriptive*

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INTRODUCTION

Inclusive education has become a binding global agenda, reinforced through the United Nations Convention on the Rights of Persons with Disabilities and operationalized in Indonesia through Minister of National Education Regulation No. 70 of 2009 and its subsequent policies. However, such normative commitments do not automatically guarantee the quality of classroom practices. According to Tero and Revalde (2024), inclusive classroom management refers to a set of approaches employed by teachers to manage heterogeneous learning environments, encompassing instructional strategies, behavior management, and responses to challenges arising from the diverse needs of students in mainstream classrooms. Without classroom management intentionally designed to be inclusive, the presence of students with special educational needs (SEN) in regular classrooms risks becoming a form of superficial inclusion that fails to substantively fulfill their right to learn. Recent empirical evidence further highlights this urgency. A systematic review revealed that teachers play a central role in fostering inclusion through scaffolding, differentiated instruction, cooperative learning, and collaboration with specialists and families. Nevertheless, limited professional

training, high student–teacher ratios, and inadequate resources remain persistent systemic challenges (Kurniawati et al., 2022; Marchan et al., 2025).

Effective inclusive classroom management requires an approach that extends beyond disability-based individual adaptations. Within this framework, Universal Design for Learning (UDL) offers an inherently inclusive paradigm. Rather than modifying instruction after barriers emerge, UDL promotes the proactive design of learning environments and activities that are accessible to all students from the outset. Developed by the Center for Applied Special Technology (CAST), UDL is grounded in neuroscience-based understandings of learner variability and is operationalized through three core principles: (1) multiple means of representation, (2) multiple means of engagement, and (3) multiple means of action and expression (CAST, 2018). In the Indonesian context, inclusive education continues to face challenges related to limited school resources, varying levels of teacher competence in accommodating learner diversity, and the high heterogeneity of learning needs in mainstream classrooms. Under such circumstances, UDL provides a relevant framework because it emphasizes flexible instructional design from the planning stage, enabling diverse learning needs to be accommodated in a more systematic manner (Tero & Revalde, 2024; Yuliana & Sukinah, 2025). The relevance of UDL to inclusive classroom management lies in its capacity to integrate the differentiation of content, process, and product within a coherent instructional design framework. Research on inclusive education strategies has shown that teachers who implement co-teaching, differentiated instruction, and UDL simultaneously tend to demonstrate more systematic classroom management practices (Aftab et al., 2024). Furthermore, methodologically structured differentiation has been found to improve learning outcomes for students both with and without learning difficulties across various elementary education settings (Tupiño et al., 2023).

Recent literature on UDL implementation at the elementary school level indicates significant progress while also revealing the complexity of the conditions surrounding its application. Through a systematic literature review of twelve empirical studies conducted in elementary schools, Karlina et al. (2025) identified that successful UDL implementation is strongly influenced by a combination of psychological and institutional factors, including teachers' self-efficacy, knowledge of UDL principles, access to professional resources, and supportive school leadership. Likewise, a meta-analysis of thirteen studies conducted between 2015 and 2021 by Almqdad et al. (2023) found that the overall effect of UDL implementation on student learning outcomes and engagement was substantial (effect size = 3.56), with positive impacts observed across K–12 educational levels, including students with disabilities. In addition, Martínez et al. (2025), using a mixed-methods approach in three schools in Ecuador, empirically demonstrated that UDL implementation enhanced both active student engagement and academic achievement. Key enabling factors included pedagogical leadership, structured teacher training, and the availability of accessible technologies. Similarly, Sharma (2024) reported a positive impact of UDL implementation on student engagement and achievement in inclusive education, while Forrosuelo (2025) documented teaching strategies applied to learners with special needs in elementary schools. Collectively, these studies confirm the strong potential of UDL as a framework for inclusive classroom management in elementary schools, while also emphasizing that contextual school conditions significantly influence the depth and quality of its implementation.

Despite the growing body of evidence supporting the effectiveness of UDL, a substantial gap remains between the ideal conditions envisioned by theory and the realities of classroom practice. A phenomenological qualitative study involving elementary school teachers revealed that although educators implemented differentiated strategies, peer tutoring, buddy systems, and assistive technologies, they continued to face challenges related to overcrowded classrooms, limited resources, insufficient professional development, and inadequate institutional support (Martínez et al., 2025). The discrepancy between inclusive policy intentions and actual classroom practices has also been systematically documented. Teachers' understanding of inclusive principles remains limited, stakeholder involvement is often insufficient, and high student–teacher ratios hinder the effective implementation of inclusive practices for students with special educational needs (Totini et al., 2025; De Leon et al., 2024). Although differentiated instruction and the use of concrete learning media have been shown to increase the engagement of students with special educational needs, limited training opportunities and low levels of family involvement continue to constitute significant barriers (Yuliana & Sukinah, 2025; Tero & Revalde, 2024). Overall, the existing literature on UDL in elementary schools has predominantly focused on learning effectiveness, teacher perceptions, and factors supporting implementation. Research specifically examining how UDL principles are operationalized within inclusive classroom management practices in Indonesian elementary schools remains limited.

This study seeks to address this gap through three substantive contributions. First, it focuses on the operational dimensions of inclusive classroom management analyzed through the lens of UDL, including the organization of physical and social learning environments, the establishment of classroom rules and routines, student grouping strategies, behavior management, and instructional differentiation. Second, it investigates the unique context of SD Labschool UNESA 2 Surabaya, a university-affiliated laboratory school that has not yet been documented in the literature as a systemic facilitator of UDL implementation (Karlina et al., 2025). Third, this study provides empirical evidence regarding how UDL principles are translated into inclusive classroom management practices within the context of Indonesian elementary education.

Based on the foregoing discussion, this study aims to describe the implementation of Universal Design for Learning (UDL)-based inclusive classroom management at SD Labschool UNESA 2 Surabaya. Specifically, it seeks to examine: (1) strategies for managing the physical and social classroom environment that reflect UDL principles; (2) forms of instructional differentiation and student grouping implemented by teachers in inclusive classrooms; and (3) supporting and inhibiting factors influencing the implementation of UDL-based inclusive classroom management.

METHOD

This study employed a descriptive qualitative approach to explore in depth the implementation of Universal Design for Learning (UDL)-based inclusive classroom management at SD Labschool UNESA 2 Surabaya. This approach was selected because it enables researchers to gain a comprehensive understanding of a phenomenon within its natural setting without administering any treatment or intervention to the research participants.

The study was conducted at SD Labschool UNESA 2 Surabaya, located on Lidah Wetan Street, Lakarsantri District, Surabaya City, East Java, Indonesia. The school was selected because it has implemented inclusive education and is supported by various support services, including special education teachers (SETs), a resource room, a transition class, and assessment and therapy services for students with special educational needs (SEN). Data collection was carried out on May 6, 2026.

Research participants were selected using purposive sampling based on their direct relevance to the focus of the study. The participants consisted of a Grade 2A classroom teacher, a special education teacher (SET), and a student with special educational needs identified by the initial "U," who had been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). The classroom teacher was selected because of her role in planning and implementing instruction in the inclusive classroom, while the special education teacher was chosen due to her involvement in providing learning support, adapting instruction, and addressing the educational needs of students with special educational needs. The student with ADHD was selected because he received educational services in both the regular classroom and the resource room, thereby providing a more comprehensive perspective on the implementation of inclusive classroom management within the school.

Data were collected through observation, interviews, and documentation. Observations were conducted directly during the learning process, with the researcher acting as a non-participant observer. In this role, the researcher observed classroom activities without actively participating in them. The observation focused on the learning environment, social interactions between typically developing students and students with special educational needs, the use of instructional media, classroom seating arrangements, the implementation of services in the resource room, and the forms of support provided by teachers to students with special educational needs.

Table 1. Observation Focus of the Study

Observation Focus	Observed Indicators
Physical Classroom Environment	Classroom layout, accessibility, and instructional media
Social Interaction	Interactions between typically developing students and students with special educational needs (SEN)
Classroom Management	Classroom rules, routines, and student grouping practices
Instructional Strategies	Content delivery, use of instructional media, and differentiated instruction
Support for Students with Special Educational Needs	Roles of the classroom teacher and special education teacher (SET)

Resource Room	Learning activities and forms of support services provided
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Semi-structured interviews were conducted with the classroom teacher and the special education teacher (SET) to obtain more in-depth information regarding the implementation of UDL-based inclusive classroom management. The interviews focused on inclusive instructional strategies, the management of diverse student abilities, curriculum and instructional material modifications, assessment practices, the use of Individualized Education Programs (IEPs), support provided for students with ADHD, classroom management practices, as well as the challenges encountered and efforts undertaken in implementing inclusive education.

Documentation was used as a supplementary data source to support and validate the findings obtained through observation and interviews. Documentary data included photographs of learning activities, students' work samples, school documents, and various records related to the implementation of inclusive education. These documents were utilized to strengthen the credibility and validity of the data collected throughout the study.

Although classroom observations were conducted during a single observation session on May 6, 2026, the study did not rely solely on observational data. Interviews with the classroom teacher and the special education teacher, along with various school documents related to the implementation of inclusive education, were employed to provide a more comprehensive understanding of the inclusive classroom management practices that had been continuously implemented within the school.

Table 2. Research Data Collection Techniques and Data Sources

Data Collection Technique	Data Sources	Data Focus
Observation	Classroom teacher, special education teacher (SET), and students	Inclusive classroom management practices and the implementation of Universal Design for Learning (UDL)
Interview	Classroom teacher and special education teacher (SET)	Strategies, challenges, and implementation of inclusive education
Documentation	School documents and activity records	Supporting data for observation and interview findings

Data were analyzed using the interactive analysis model proposed by Miles, Huberman, and Saldaña (2014), which consists of three stages: data reduction, data display, and conclusion drawing and verification. During the data reduction stage, all collected information was classified according to the research focus and the three core principles of Universal Design for Learning (UDL), namely multiple means of representation, multiple means of engagement, and multiple means of action and expression. The categorized data were then presented in the form of narrative descriptions and tables to facilitate interpretation. Finally, conclusions were drawn and continuously verified throughout the analysis process to ensure the accuracy and trustworthiness of the findings.

To ensure data credibility, both technique triangulation and member checking were employed. Technique triangulation was conducted by comparing findings obtained from observations, interviews, and documentation to identify consistent and mutually reinforcing information. In addition, member checking was carried out by seeking confirmation from participants regarding the researcher's interpretations to ensure that the findings accurately reflected their experiences and perspectives.

Prior to data collection, formal permission was obtained from the school. All participants were informed about the purpose of the study, and their confidentiality was protected through the use of initials in accordance with research ethics principles.

RESULTS AND DISCUSSION

The first finding relates to the management of the physical and social classroom environment. The results indicate that SD Labschool UNESA 2 Surabaya has provided various facilities and support services to facilitate the implementation of inclusive education, including a resource room, a transition class, special education teachers (SETs), therapy services, and initial assessments for prospective students. In addition, the number of students with special educational needs (SEN) in each classroom is limited to a maximum of four students to support the effectiveness of the learning process. The availability of these facilities and services demonstrates the school's commitment to creating a learning environment that accommodates diverse student needs.

From a physical perspective, the school provides a resource room and a transition class as additional intervention spaces, alongside visual and concrete instructional media available in regular classrooms. Special education teachers actively support students with SEN within the classroom setting without separating them from their peers. This practice reflects the principle of *multiple means of engagement* within Universal Design for Learning (UDL), which emphasizes the provision of learning environments that enable all students to participate actively in learning according to their individual characteristics and needs (CAST, 2018). The availability of the resource room is consistent with the findings of Han and Lei (2025), whose scoping review of 31 studies in China concluded that resource rooms play a significant role in supporting the learning of students with special educational needs.

In addition to serving as a space for individualized support, the resource room provides teachers with greater flexibility to adapt instructional strategies according to students' needs. Consequently, students with special educational needs receive the support they require without losing opportunities to learn alongside their peers in regular classrooms. This condition reflects the school's efforts to establish an accessible and responsive learning environment that accommodates diverse learner characteristics.

From a social perspective, the school fosters an inclusive culture by promoting tolerance and empathy from an early age. Teachers encourage regular students to understand and respect differences, and based on observation and documentation findings, incidents of bullying involving students with special educational needs were rarely observed. Minor conflicts among students were promptly addressed through teacher guidance and support. These conditions reflect the characteristics of a positive inclusive school climate, characterized by a sense of safety, social acceptance, and equal opportunities for participation for all students (Wulan & Sanjaya, 2022).

This finding is supported by the study of Duka et al. (2024), which demonstrated that a collaborative classroom climate contributes to increased learning motivation, engagement, and self-efficacy among students with special educational needs. Similar patterns were observed at SD Labschool UNESA 2 Surabaya, where students with SEN actively participated in various school activities, including sports, art performances, learning projects, and extracurricular programs such as painting, dancing, and fitness activities. Furthermore, several students with SEN achieved success in various competitions, indicating that the school environment provides equitable opportunities for participation and achievement for all learners.

The second finding concerns instructional differentiation and curriculum modification. Based on observations and interviews, teachers routinely implemented content simplification, content repetition, scaffolded instructions, and the use of visual and concrete instructional media.



Figure 1. Modified instructional media to support inclusive learning.

Source: Research Documentation, May 6, 2026.

Curriculum modification was implemented contextually. Students with special educational needs (SEN) were not expected to achieve the same standards as their typically developing peers; instead, learning expectations were adjusted according to their individual abilities and learning profiles. Reducing the number of assessment items and providing additional support during evaluations represent concrete applications of the UDL principle of *multiple means of action and expression*. This practice directly addresses the concern identified by Andini et al. (2020), who reported that many teachers in inclusive elementary schools continue to employ uniform instructional approaches. At SD Labschool UNESA 2 Surabaya, differentiation is embedded in daily classroom practices, although it has not yet been formally standardized within a written curriculum policy. Unlike the model developed by Marlina et al. (2023), which was standardized through validated assessment instruments, assessment practices at SD Labschool UNESA 2 remain largely dependent on teachers' professional judgment in adapting instruction to students' individual needs and characteristics.

Student grouping and participation management emerged as the third dimension of inclusive classroom management. Based on observational findings, peer tutoring and buddy system strategies were implemented to encourage positive interactions between students with SEN and their peers. This finding is consistent with the study conducted by Schwab et al. (2021), which used sociometric network analysis involving 449 students across 25 inclusive elementary classrooms and found that students with SEN were at greater risk of social isolation and that teachers' perceptions of students' friendships were often inaccurate. In contrast, observations at SD Labschool UNESA 2 revealed a more supportive social environment in which interactions between students with SEN and their peers occurred naturally. This condition may be linked to the UDL-based instructional design adopted by the school, which promotes group work and collaborative learning activities as opportunities to foster peer relationships rather than treating them as merely supplementary pedagogical strategies.

Behavior management constituted the fourth critical dimension, particularly in relation to Utara (a Grade 2A student diagnosed with ADHD). Observation findings indicated that the classroom teacher and the special education teacher consistently implemented behavior management strategies grounded in positive reinforcement. Structured classroom routines provided predictability for the student, while calm responses and individualized guidance were used when disruptive behaviors occurred. The special education teacher actively supported the student within the classroom, ensuring that the learning process continued without significant disruption. These findings are consistent with Agustin (2025), whose phenomenological study identified structured routines, Positive Behavior Support, multisensory learning, and peer support as effective strategies for managing students with ADHD in inclusive classrooms. These strategies are closely aligned with the UDL principle of *multiple means of engagement*. Furthermore, the involvement of special education teachers with backgrounds in special education and psychology reflects the collaborative model recommended by Malizal and Rizqi (2025), which emphasizes close cooperation among classroom teachers, special education teachers, and parents in creating effective inclusive support systems. Evidence from schools lacking adequate special education support, as documented by Putri et al. (2025) in their study of students with ADHD in mainstream elementary schools, further highlights the crucial role of special education teachers in inclusive education.

The fifth dimension relates to assessment and evaluation practices. Based on interview data and document analysis, assessment at SD Labschool UNESA 2 was conducted flexibly through various methods, including written tests, observations, project assignments, practical activities, student work products, and assessments of attitudes and behavior. Teachers emphasized individual progress rather than solely focusing on academic achievement. Students who had not yet mastered the learning material received additional instruction and support. This approach embodies the principle of *multiple means of action and expression* while avoiding unfair comparisons of achievement among students. Marlina et al. (2023) validated a similar approach through the development of a differentiated assessment model comprising four dimensions that demonstrated strong validity and reliability in Indonesian inclusive schools.

The sixth-dimension concerns school–parent collaboration. The findings indicate that SD Labschool UNESA 2 maintains regular communication with parents through WhatsApp and face-to-face meetings, organizes parenting programs, and commemorates National Disability Day through activities involving parents. This pattern is consistent with the findings of Paccaud et al. (2021), who identified trust, clear communication, and parental involvement in decision-making as critical components of effective school–family partnerships within inclusive education settings. Similarly, Yuliana and Sukinah (2025) found that although differentiated instruction successfully increased the engagement of students with special educational needs, limited family involvement continued to hinder the continuity of support services beyond the school setting. This finding provides an important consideration for the future development of school–family partnership programs.

Classroom Management at SD Labschool UNESA 2

UDL Principle	Forms of Implementation at SD Labschool UNESA 2	Observed / Explored Aspects
Multiple Means of Representation	Simplified learning materials; visual and concrete instructional media; content repetition; scaffolded instructions; resource room and transition class as alternative learning spaces	Observation of instructional media use; documentation of material modifications; interviews regarding instructional strategies

Multiple Means of Engagement	Special education teacher (SET) support within regular classrooms; positive reinforcement; structured routines; a culture of tolerance; participation of students with special educational needs (SEN) in academic and non-academic activities	Observation of teacher–student and SET–student interactions; documentation of school activities; interviews regarding behavior management
Multiple Means of Action and Expression	Diverse assessment methods (written tests, projects, practical tasks, student work products, and attitude assessments); reduced number of assessment items; task modifications; peer tutoring; buddy system	Observation of assessment practices; documentation of students' work; interviews regarding assessment systems

Overall, the findings indicate that SD Labschool UNESA 2 has developed inclusive classroom management practices that substantially reflect the three core principles of Universal Design for Learning (UDL), as presented in Table 3. This finding is consistent with Karlina et al. (2025), who emphasized that successful UDL implementation is influenced by a combination of institutional and psychological factors. The meta-analysis conducted by Almeqdad et al. (2023) further supports this conclusion, reporting a large effect size (3.56) for the impact of UDL on student engagement and learning outcomes. Moreover, Martínez et al. (2025) highlighted pedagogical leadership and structured teacher professional development as key prerequisites for successful UDL implementation. These conditions are evident at SD Labschool UNESA 2 through the regular organization of training programs, seminars, and professional sharing sessions among teachers.

Factors in the Implementation of ULD-Based Inclusive Classroom Management

Supporting Factors	Inhibiting Factors
Availability of special education teachers (SETs) with backgrounds in special education and psychology to provide individualized support within the classroom	Student–teacher ratios limit the intensity of support when the number of students with special educational needs (SEN) increases
Support service infrastructure, including a resource room, transition class, therapy services, and structured initial assessments	Parental involvement in academic decision-making remains limited
Inclusive school culture characterized by embedded tolerance, minimal bullying, and active peer support from typically developing students	Curriculum adaptations remain informal and largely dependent on teachers' individual initiatives rather than standardized procedures
Committed school leadership reflected in maintaining SEN enrollment quotas, organizing parenting programs, and commemorating National Disability Day	Adaptive learning resources are not yet comprehensively available for all types of special educational needs

Table 4 summarizes the supporting and inhibiting factors influencing implementation. A key distinguishing factor is the school's academic affiliation with Universitas Negeri Surabaya (UNESA), which provides access to professional knowledge, expertise, and continuous professional development opportunities. Nevertheless, several challenges remain. Curriculum adaptations are still largely informal and dependent on individual teacher initiative, parental involvement in academic decision-making has not yet reached an optimal level, and adaptive learning resources are not comprehensively available for all categories of special educational needs. These limitations resonate with the findings of De Leon et al. (2024) and Totini et al. (2025), who documented that the gap between inclusive policy intentions and actual classroom practices stems from limited teacher training, insufficient stakeholder involvement, and inadequate adaptive resources.

This study contributes to the academic discourse in three significant ways. First, from an empirical perspective, it documents how UDL principles are operationalized within inclusive classroom management practices in Indonesian elementary schools, an area that has received relatively limited attention in previous research. Second, the context of SD Labschool UNESA 2 as a laboratory school expands current understanding of the role of institutional affiliation with higher education institutions in supporting the implementation of inclusive education. Third, the findings demonstrate that successful UDL implementation depends not only on

teachers' competencies but also on systemic support, including the availability of special education teachers, an inclusive school culture, and access to professional training and resources. These findings offer a broader perspective on the importance of institutional support in developing inclusive education practices at the elementary school level. At the policy level, the results suggest that the Ministry of Education, Culture, Research, and Technology of Indonesia should consider school–teacher education institution partnerships as a systemic strategy for strengthening the capacity of inclusive schools nationwide.

Several limitations of this study should be acknowledged. First, data collection was conducted during a single observation session, meaning that the findings may not fully capture variations in classroom management practices over time. Second, the participants were limited to two teachers and one student from a single classroom, restricting the generalizability of the findings to other classrooms within SD Labschool UNESA 2 or to inclusive schools more broadly. These limitations should be viewed as opportunities for future research, particularly longitudinal and multi-class studies that can provide a more comprehensive understanding of the implementation and sustainability of UDL-based inclusive classroom management practices.

CONCLUSION

This study describes UDL-based inclusive classroom management at SD Labschool UNESA 2 Surabaya through six dimensions: physical and social classroom environment management, instructional differentiation, student grouping and participation, behavior management, flexible assessment practices, and parent collaboration. The findings indicate that the three core principles of UDL multiple means of representation, multiple means of engagement, and multiple means of action and expression have been integrated into the inclusive classroom management system, supported by service infrastructure, special education teacher (SET) competence, an inclusive school culture, and committed leadership. The school's academic affiliation with Universitas Negeri Surabaya (UNESA) serves as one of the supporting factors that facilitates a more systematic implementation of UDL at SD Labschool UNESA 2 Surabaya.

These findings demonstrate that UDL implementation does not solely depend on teachers' ability to manage instruction but also requires comprehensive school-level support, including human resources, support services, inclusive school culture, and continuous professional capacity building. Nevertheless, the findings should be interpreted within the limitations of a single case study with limited observation, meaning that transferability to other inclusive school contexts should be approached with caution.

This study recommends: (1) formalizing UDL-based curriculum adaptation policies within school planning documents to reduce dependence on individual teacher initiatives; (2) strengthening parental involvement in academic decision-making through more structured collaborative programs; (3) developing a comprehensive adaptive learning resource bank to accommodate various types of special educational needs; and (4) at the policy level, promoting school–teacher education institution partnerships as a systemic strategy to strengthen the capacity of inclusive schools in Indonesia. Future research should consider comparative studies between laboratory schools and non-laboratory inclusive schools to provide deeper insights into how institutional contexts influence the extent of UDL implementation.

AUTHOR CONTRIBUTIONS

Aliya Marsya As-Syifa': Conceptualization, Investigation, Data Curation, Formal Analysis, Writing Original Draft. Hitta Alfi Muhimmah: Methodology, Validation, Supervision, Writing Review & Editing.

DECLARATION OF COMPETING INTEREST

The authors declare no known financial conflicts of interest or personal relationships that could have influenced the work reported in this manuscript.

DECLARATION OF ETHICS

The authors declare that the research and writing of this manuscript adhere to ethical standards of research and publication, in accordance with scientific principles, and are free from plagiarism.

DECLARATION OF ASSISTIVE TECHNOLOGIES IN THE WRITING PROCESS

The authors declare that Generative Artificial Intelligence and other assistive technologies were not excessively utilized in the research and writing processes of this manuscript.

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